

McDonough & Rea Associates, Inc.

Traffic and Transportation Consulting

Kevin P. McDonough (1953-1994)
John H. Rea, P.E.
Jay S. Troutman, Jr., P.E.
Scott T. Kennel

Revised January 27, 2023
March 3, 2022

Town of Clinton Land Use Board
Municipal Building
43 Leigh St.
P.O. Box 5194
Clinton, NJ 08809

Re: Clinton Commons
Lot 32 in Block 14
Town of Clinton, Hunterdon County
MRA File No. 17-182

Dear Board Members:

McDonough and Rea Associates (MRA) has been asked to prepare a *Traffic Statement* for plans prepared by E&LP, for construction of a mixed-use residential/commercial development on the noted property. The property is located along the southbound lanes of New Jersey State Route 31 south of its intersection with Halstead Street. *Figure 1, a Site Location Map in the Appendix*, shows the approximate location of the property.

Access is proposed from 2 right-in/right-out driveways from/to the southbound lanes of Route 31. According to the Site Plan, the following components are proposed:

- 56 Townhomes
- 2,558 SF fast food restaurant with drive-thru
- 21,980 SF supermarket
- 5,700 SF convenience store with gas

Since the subject property is proposing an access to New Jersey State Route 31, which is under the jurisdiction of the New Jersey Department of Transportation (NJDOT) a permit will be required from NJDOT and a more detailed, *Traffic Impact Analysis* will be required as part of the NJDOT application. The Town of Clinton will be copied on the NJDOT application and the NJDOT *Traffic Impact Analysis*. The NJDOT *Access Permit* will be phased consisting of the residential component as *Phase I, a Minor Access Permit Application* and all of the commercial uses as *Phase II, Major Access with Planning Application*. The *Phase I Minor Access Application* will be submitted in the near term and the *Phase II Major Access Application* will be submitted at a future date when the commercial users and tenants are finalized.

Please reply to:

- ☒ 1431 Lakewood Road, Suite C, Manasquan, NJ 08736 • (732) 528-7076 • Fax (732) 528-6673
- ☐ 105 Elm Street, Lower Level, Westfield, NJ 07090 • (908) 789-7180 • Fax (908) 789-7181



McDonough & Rea Associates, Inc.

Traffic and Transportation Consulting

1431 Lakewood Road, Suite C, Manasquan, NJ 08736 • (732) 528-7076 • Fax (732) 528-6673
105 Elm Street, Lower Level, Westfield, NJ 07090 • (908) 789-7180 • Fax (908) 789-7181

Town of Clinton Land Use Board

-2-

January 27, 2023

This *Traffic Statement* will focus on projected levels of service at the site access to Route 31 as well as availability and accessibility of the parking supply.

SCOPE OF STUDY

In order to prepare this *Traffic Statement*, MRA has conducted the following tasks:

1. Made field visits to the site to establish existing roadway and traffic conditions in the area.
2. Conducted peak hour traffic counts for the critical weekday AM and PM peak hours at the intersection of Route 31/Halstead Street.
3. Prepared estimates of site generated traffic to be generated by the residential and commercial uses based upon the *11th Edition* of the Institute of Transportation Engineers (ITE) *Trip Generation Manual*.
4. Prepared estimates of future traffic volume demand for the design year of the project (2027) including historical background traffic growth rate data in the area from NJDOT *Historical Traffic Volume* data.
5. Conducted level of service capacity analyses for the Route 31 driveways.
6. Reviewed the site with respect to availability and accessibility of the parking supply and conformance with Town of Clinton ordinance requirements.

The following report sets forth the database accumulated and the conclusions reached with respect to the proposed mixed-use development.

EXISTING CONDITIONS

The subject property is located along the southbound lanes of Route 31 south of its intersection with Halstead Street and north of Georges Place. Along the property frontage, Route 31 provides for 2 southbound lanes and a full width shoulder.

The subject property contains 28 acres located north of Georges Place, bounded to the east by Route 31 and bounded to the west by the south branch of the Raritan River.



McDonough & Rea Associates, Inc.

Traffic and Transportation Consulting

1431 Lakewood Road, Suite C, Manasquan, NJ 08736 • (732) 528-7076 • Fax (732) 528-6673
105 Elm Street, Lower Level, Westfield, NJ 07090 • (908) 789-7180 • Fax (908) 789-7181

Town of Clinton Land Use Board

-3-

January 27, 2023

EXISTING TRAFFIC VOLUMES

Traffic volume data was collected in February 2022 during the weekday AM peak street hour and weekday PM peak street hour at the intersection of Route 31 and Halstead Street. These are the timeframes when the combination of traffic on the adjacent roadway network and traffic generated by the commercial uses and the townhomes will be at a maximum. *Figure 2* in the *Appendix* illustrates weekday AM peak street hour and PM peak street hour traffic volumes which were adjusted by approximately 25 percent after a review of historical NJDOT 2019 data collected along Route 31 south of the site.

TRIP GENERATION

Estimates of traffic to be generated by the commercial and residential uses were made after consulting the *11th Edition* of the *ITE Trip Generation* manual and trip generation rates published by the NJDOT in the *State Highway Management Code* that is mandated for preparation of traffic studies on the State highway system. *Table I* illustrates the anticipated peak hour traffic generation and includes *pass-by* traffic for the convenience store with gas and the fast food with drive-thru restaurant in accordance with ITE data. *Pass-by* traffic is traffic that is already on the adjacent roadway network and is therefore not *new* traffic generated to the area but is diverted into the site driveways as they are passing the site. *Pass-by* traffic tends to limit the impact of uses such as a convenience store with gas sales and fast-food restaurant on the adjacent roadway network.

TABLE II
TRIP GENERATION
CLINTON COMMONS

USE	AM PSH			PM PSH		
	IN	OUT	TOTAL	IN	OUT	TOTAL
56 Townhomes LUC 215	9	18	27	18	14	32
2,558 SF FF Rest. w/drive-thru LUC 934	59	58	117	46	42	88
Pass-by trips	-29	-29	-58	-23	-71	-44
21,988 Supermarket LUC 850	38	25	63	99	99	198
Pass-by trips	-	-	-	-35	-35	-70
5,700 SF Convenience Store w/gas LUC 945	154	154	308	154	154	308
Pass-by trips	-117	-117	-234	-117	-117	-234
Total Site Trips	260	255	515	317	309	626
Total Pass-by Trips	-146	-146	-292	-175	-173	-348
Total New Site Trips	114	109	223	142	136	278



McDonough & Rea Associates, Inc.

Traffic and Transportation Consulting

1431 Lakewood Road, Suite C, Manasquan, NJ 08736 • (732) 528-7076 • Fax (732) 528-6673
105 Elm Street, Lower Level, Westfield, NJ 07090 • (908) 789-7180 • Fax (908) 789-7181

Town of Clinton Land Use Board

-4-

January 27, 2023

ANALYSIS OF FUTURE TRAFFIC VOLUMES

A design year of 2027 was assumed for analysis after consultation with the client and in expectation of necessary approvals from the Town of Clinton, Hunterdon County and the NJDOT. The NJDOT's *Historical Growth Rate* data for the area was consulted with a finding that traffic volumes are anticipated to grow at a rate of 1.25 percent per year for Route 31. In order to prepare a conservative analysis, MRA assumed a 1.5 percent per year background traffic growth rate of 1.5 percent for 3 years and 0.5 percent for 2 years onto the 2022 adjusted traffic volumes for Route 31. *Figure 4* in the *Appendix* illustrates year 2027 post-development traffic volumes.

Traffic engineers calculate levels of service of unsignalized intersections which relate to the quality of traffic flow. Level of service is a measure of average control delay. Average control delay is the time lost due to deceleration and the amount of time from when a vehicle is stopped for a traffic control device (or at the end of the queue) to when the vehicle departs the intersection. Delay is a relative quantity of driver discomfort, frustration, fuel consumption, and loss in travel time.

Levels of service range from "A" to "F" with "A" being the highest or best attainable level of service. Level of service "E" with average control delays of not more than 50 seconds per vehicle at an unsignalized intersection indicates near to or at capacity conditions and is generally considered the limit of acceptable level of service and delay.

Full definitions of levels of service for unsignalized intersections as well as level of service summaries are included in the *Appendix*. The intersections studied by this report were analyzed according to the procedures set forth in the *Highway Capacity Manual 2010*, using the *Highway Capacity Software (HCS)*.

The site driveway to Route 31 was analyzed assuming construction of a right turn lane along Route 31 at the northerly driveway.

Based on an analysis of the Route 31 driveways, assuming construction of a southbound dedicated right turn lane for the northerly driveway, exiting movements to Route 31 will operate at level of service "D" during the AM peak street hour and "C" during the PM peak street hour.



McDonough & Rea Associates, Inc.

Traffic and Transportation Consulting

1431 Lakewood Road, Suite C, Manasquan, NJ 08736 • (732) 528-7076 • Fax (732) 528-6673
105 Elm Street, Lower Level, Westfield, NJ 07090 • (908) 789-7180 • Fax (908) 789-7181

Town of Clinton Land Use Board

-5-

January 27, 2023

PARKING

Based on the Town of Clinton ordinance requirements, 190 parking spaces are proposed to support the 3 commercial buildings. One hundred and seventy-seven (177) spaces are required by The Town of Clinton and 190 spaces are provided. Therefore, parking is deemed to be well distributed among the 3 commercial buildings and appropriate for the uses under consideration.

The parking supply for the townhomes exceeds the requirements of the New Jersey Residential Site Improvement Standards (RSIS) of 134 spaces where 233 garage, driveway and visitor parking spaces are provided.

CONCLUSIONS

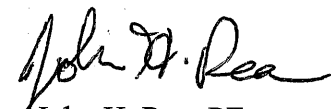
It is concluded, based on the analysis set forth in this report, that exiting movements at the Route 31 driveways from the mixed-use development will do so at acceptable levels of service for the 2027 design year.

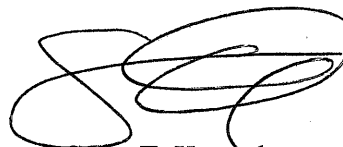
The foregoing analyses assumes construction of a southbound right turn lane on Route 31 at the primary northerly driveway.

The 190 parking spaces provided for the 3 commercial buildings exceeds the Town of Clinton ordinance requirement of 177 spaces and parking is therefore deemed to be adequate for the commercial uses. The parking supply for the townhomes meets and exceeds the RSIS requirement.

A representative of MRA will be in attendance at an upcoming Town of Clinton public hearing to provide expert testimony and answer any questions board members, board experts or the public may have.

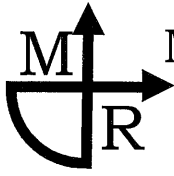
Very truly yours,


John H. Rea, PE
Principal


Scott T. Kennel
Sr. Associate

cc: Bhaskar Halari, PE

APPENDIX



McDONOUGH & REA ASSOCIATES

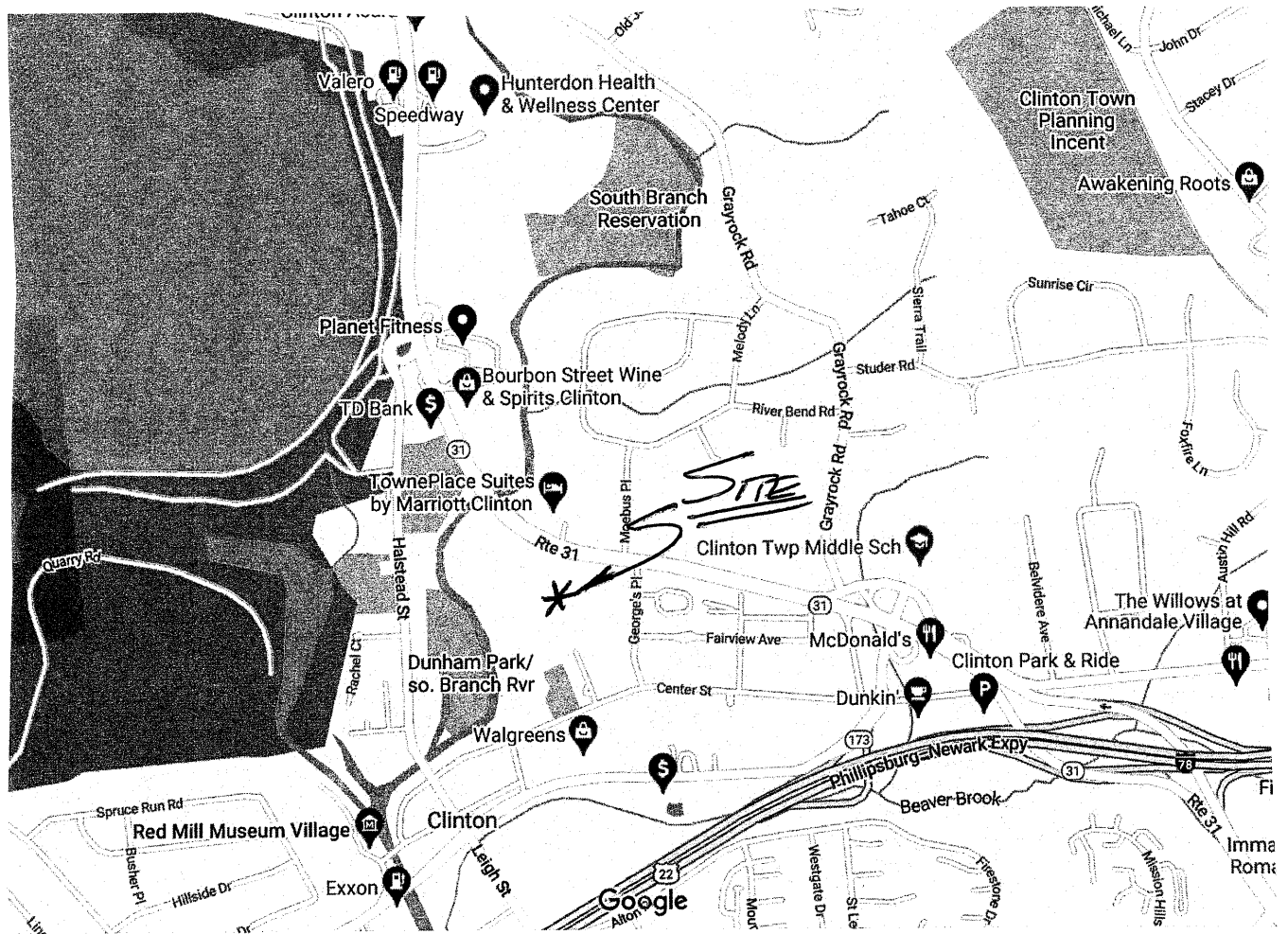
TRAFFIC AND TRANSPORTATION CONSULTING

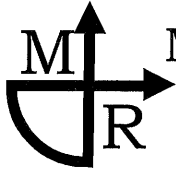
FIGURE 1

JOB NO.
17-182

DATE:
FEB 2022

SUBJECT: CLINTON COMMONS - TOWN OF CLINTON, HUNTERDON CO.
SITE LOCATION MAP





McDONOUGH & REA ASSOCIATES

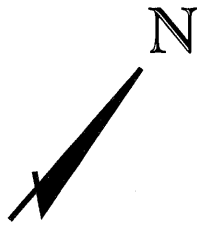
TRAFFIC AND TRANSPORTATION CONSULTING

FIGURE 2

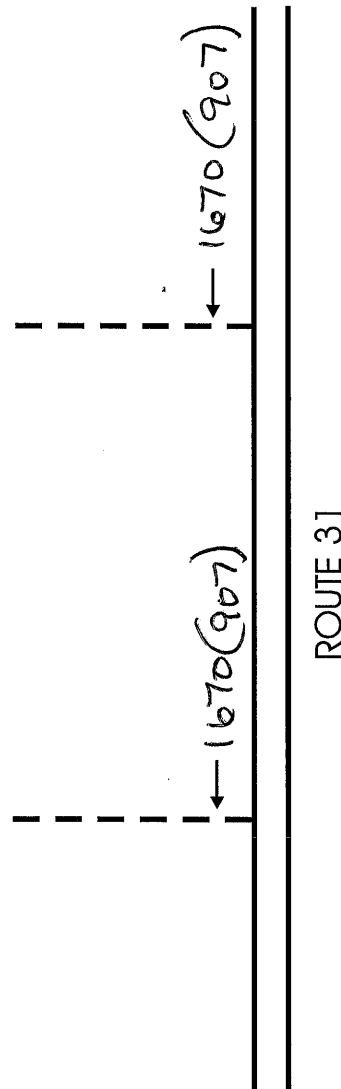
JOB NO.
17-182

DATE:
FEB 2022

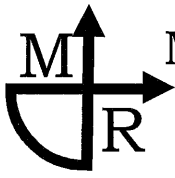
SUBJECT: CLINTON COMMONS - TOWN OF CLINTON, HUNTERDON CO.
EXISTING BASE PEAK HOUR TRAFFIC VOLUMES



SITE



LEGEND: ← AM PSH(PM PSH)



McDONOUGH & REA ASSOCIATES

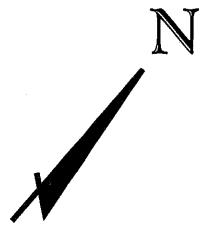
TRAFFIC AND TRANSPORTATION CONSULTING

FIGURE 3

JOB NO.
17-182

DATE:
FEB 2022

SUBJECT: CLINTON COMMONS - TOWN OF CLINTON, HUNTERDON CO.
SITE GENERATED TRAFFIC VOLUMES



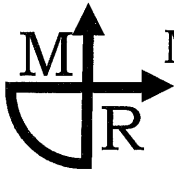
SITE

180 (200)
155 (191)

80 (117)
100 (118)

ROUTE 31

LEGEND: ← AM PSH(PM PSH)



McDONOUGH & REA ASSOCIATES

TRAFFIC AND TRANSPORTATION CONSULTING

FIGURE 4

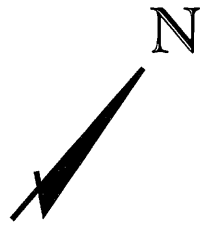
JOB NO.

17-182

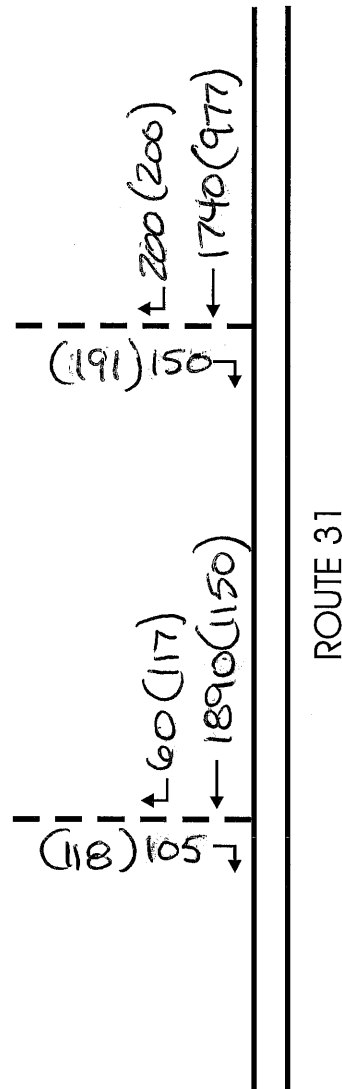
DATE:

FEB 2022

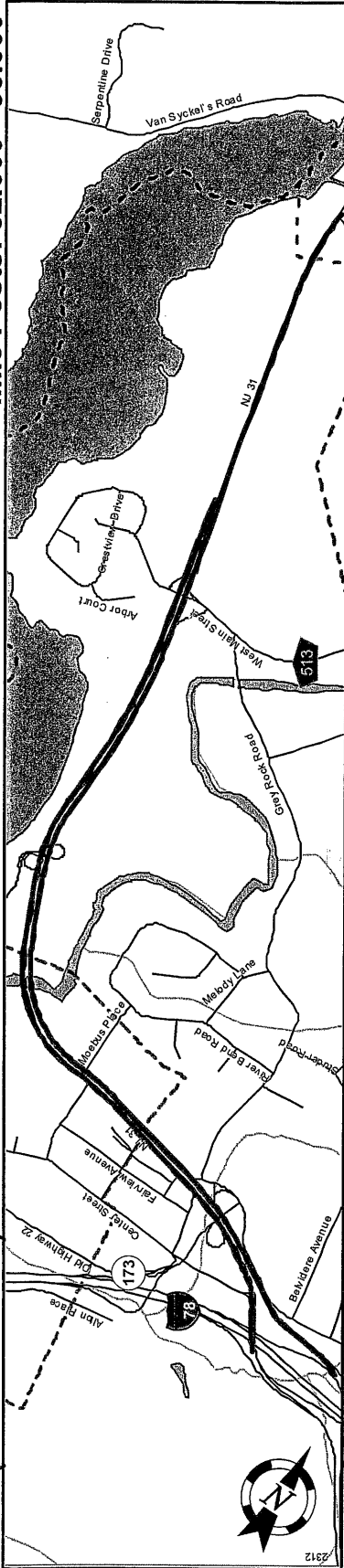
SUBJECT: CLINTON COMMONS - TOWN OF CLINTON, HUNTERDON CO.
2027 FUTURE BUILD TRAFFIC VOLUMES



SITE



LEGEND: ← AM PSH (PM PSH)



Pavement	26
Shoulder	24
Number of Lanes	12
Speed Limit	2 50
Street Name	NJ 31
Interstate Route	287
US Route	22
NJ Route	33
County Road	689
Interchange Number	2
Grade Separated Interchange	
Traffic Signal	
Traffic Monitoring Sites	WIM AVC VOL
Road Underpass	
Road Overpass	
Street Name	NJ 31
Jurisdiction	N.J.D.O.T.
Functional Class	Urban Principal Arterial
Federal Aid - NHS Sy	NHS
Control Section	1013
Speed Limit	50
Number of Lanes	2
Med. Type	Positive
Med. Width	12
Pavement	24
Shoulder	12
Traffic Volume	
Traffic Sta. ID	
Structure No.	1013157 N/A 1004153 1013160
Enlarged Views	

CLINTON TOWN CENTER
 ROUTE 31 & HALSTEAD STREET
 TOWN OF CLINTON, HUNTERDON COUNTY
 MRA JOB 17-182 TUESDAY AM COUNT

McDonough & Rea Associates
 1431 Lakewood Road Suite C
 Manasquan NJ 08736
 (732) 528-7076

File Name : 17182 rt 31 & halstead am1
 Site Code : 00017182
 Start Date : 2/8/2022
 Page No : 1

Groups Printed- CARS - TRUCKS - SCHOOL BUS

Start Time	Route 31 Southbound				Route 31 NB Jughandle Westbound				Route 31 Northbound				Halstead Street Eastbound			
	Thru	Thru to Jug	Right	RTOR	App. Total	Left	Thru	App. Total	Thru	Thru to Jug	App. Total	Left	Thru	Right	RTOR	App. Total
07:00 AM	301	19	33	3	356	12	2	14	128	14	142	32	4	1	0	37
07:15 AM	312	13	43	3	371	11	3	14	147	15	162	28	4	2	1	35
07:30 AM	329	20	31	10	390	14	3	17	128	16	144	55	6	3	0	64
07:45 AM	296	17	45	3	361	11	2	13	159	13	172	38	1	1	1	41
Total	1238	69	152	19	1478	48	10	58	562	58	620	153	15	7	2	177
08:00 AM	326	23	31	8	388	9	2	11	141	12	153	23	6	0	3	32
08:15 AM	327	13	40	5	385	16	0	16	141	14	155	51	4	0	0	55
08:30 AM	278	22	33	8	341	12	4	16	147	16	163	31	2	1	1	35
08:45 AM	228	28	38	8	302	15	6	21	153	21	174	52	12	2	1	67
Total	1159	86	142	29	1416	52	12	64	582	63	645	157	24	3	5	189
Grand Total	2397	155	294	48	2894	100	22	122	1144	121	1265	310	39	10	7	366
Approch %	82.8	5.4	10.2	1.7		82.0	18.0	2.6	90.4	9.6		84.7	10.7	2.7	1.9	
Total %	51.6	3.3	6.3	1.0	62.3	2.2	0.5		24.6	2.6	27.2	6.7	0.8	0.2	0.2	7.9

Start Time	Route 31 Southbound				Route 31 NB Jughandle Westbound				Route 31 Northbound				Halstead Street Eastbound			
	Thru	Thru to Jug	Right	RTOR	App. Total	Left	Thru	App. Total	Thru	Thru to Jug	App. Total	Left	Thru	Right	RTOR	App. Total
Intersection	1278	73	147	26	1524	50	7	57	569	55	624	167	17	4	4	192
Volume	83.9	4.8	9.6	1.7		87.7	12.3		91.2	8.8		87.0	8.9	2.1	2.1	
Percent	329	20	31	10	390	14	3	17	128	16	144	55	6	3	0	64
07:30 Volume																
Peak Factor																0.974
High Int.	07:30 AM					07:30 AM			07:45 AM			07:30 AM				
Volume	329	20	31	10	390	14	3	17	159	13	172	55	6	3	0	64
Peak Factor					0.977			0.838			0.907					0.750

CLINTON TOWN CENTER
 ROUTE 31 & HALSTEAD STREET
 TOWN OF CLINTON, HUNTERDON COUNTY
 MRA JOB 17-182 MONDAY PM COUNT

McDonough & Rea Associates
 1431 Lakewood Road Suite C
 Manasquan NJ 08736
 (732) 528-7076

File Name : 17182 rt 31 & halstead pm1
 Site Code : 00017182
 Start Date : 2/7/2022
 Page No : 1

Groups Printed- CARS - TRUCKS - SCHOOL BUS

	Route 31 Southbound					Route 31 NB Jughandle Westbound					Route 31 Northbound					Halstead Street Eastbound				
Start Time	Thru	Thru to Jug	Right	RTOR	App. Total	Left	Thru	App. Total	Thru	Thru to Jug	App. Total	Left	Thru	Right	RTOR	App. Total	Int. Total			
04:00 PM	169	17	26	9	221	16	9	25	266	26	292	48	9	2	0	59	597			
04:15 PM	171	20	30	14	235	18	7	25	269	23	292	57	8	2	2	69	621			
04:30 PM	166	15	30	5	216	17	13	30	294	36	330	44	11	5	0	60	636			
04:45 PM	130	12	23	16	181	23	14	37	274	31	305	53	9	1	2	65	588			
Total	636	64	109	44	853	74	43	117	1103	116	1219	202	37	10	4	253	2442			
05:00 PM	172	12	30	16	230	15	8	23	282	25	307	53	14	0	2	69	629			
05:15 PM	136	13	31	6	186	14	11	25	269	20	289	52	10	2	0	64	564			
05:30 PM	121	8	16	11	156	11	10	21	242	23	265	33	12	3	0	48	490			
05:45 PM	123	15	17	8	163	15	13	28	276	28	304	49	11	6	0	66	561			
Total	552	48	94	41	735	55	42	97	1069	96	1165	187	47	11	2	247	2244			
Grand Total	1188	112	203	85	1588	129	85	214	2172	212	2384	389	84	21	6	500	4686			
Approch %	74.8	7.1	12.8	5.4		60.3	39.7		91.1	8.9		77.8	16.8	4.2	1.2					
Total %	25.4	2.4	4.3	1.8	33.9	2.8	1.8	4.6	46.4	4.5	50.9	8.3	1.8	0.4	0.1	10.7				

	Route 31 Southbound					Route 31 NB Jughandle Westbound					Route 31 Northbound					Halstead Street Eastbound				
Start Time	Thru	Thru to Jug	Right	RTOR	App. Total	Left	Thru	App. Total	Thru	Thru to Jug	App. Total	Left	Thru	Right	RTOR	App. Total	Int. Total			
Peak Hour From 04:00 PM to 05:45 PM - Peak 1 of 1																				
Intersection	04:15 PM																			
Volume	639	59	113	51	862	73	42	115	1119	115	1234	207	42	8	6	263	2474			
Percent	74.1	6.8	13.1	5.9		63.5	36.5		90.7	9.3		78.7	16.0	3.0	2.3					
04:30 Volume	166	15	30	5	216	17	13	30	294	36	330	44	11	5	0	60	636			
Peak Factor																	0.972			
High Int. Volume	04:15 PM					04:45 PM			04:30 PM			04:15 PM								
	171	20	30	14	235	23	14	37	294	36	330	57	8	2	2	69				
Peak Factor					0.917			0.777			0.935					0.953				

NJDOT ACCESS PERMIT ANNUAL BACKGROUND GROWTH RATE TABLE

Valid for NJDOT Access Permits submitted April 2019 - April 2021

COUNTY		Functional Classification											
		RURAL						URBAN					
		Interstate	Other Principal Arterial	Minor Arterial	Major Collector	Minor Collector	Local	Interstate	Freeway	Principal Arterial	Minor Arterial	Collector	Local
ATLANTIC		N/A	1.00%	1.50%	1.00%	1.00%	2.75%	N/A	1.00%	1.00%	1.00%	1.75%	1.00%
BERGEN		N/A	N/A	N/A	N/A	N/A	N/A	2.50%	2.00%	1.50%	2.50%	1.00%	1.00%
BURLINGTON		1.50%	1.75%	1.00%	1.25%	1.00%	1.25%	2.00%	2.00%	1.00%	1.50%	1.50%	1.00%
CAMDEN		1.50%	1.25%	1.00%	1.25%	1.00%	1.00%	2.25%	1.75%	1.00%	1.00%	2.25%	1.00%
CAPE MAY		N/A	1.50%	2.25%	1.00%	2.25%	1.25%	N/A	1.00%	1.00%	1.00%	1.00%	1.00%
CUMBERLAND		N/A	1.00%	1.00%	1.00%	1.00%	2.00%	N/A	1.00%	1.00%	1.25%	1.25%	1.00%
ESSEX		N/A	N/A	N/A	N/A	N/A	N/A	2.00%	3.00%	1.00%	2.00%	1.00%	1.50%
GLOUCESTER		1.50%	1.25%	1.00%	1.25%	1.75%	1.00%	2.50%	1.75%	1.00%	1.00%	2.25%	1.50%
HUDSON		N/A	N/A	N/A	N/A	N/A	N/A	1.00%	1.00%	1.00%	1.00%	1.00%	1.50%
HUNTERDON		1.00%	1.00%	1.00%	2.00%	1.00%	1.00%	2.25%	2.00%	1.25%	1.00%	2.50%	1.00%
MERCER		1.50%	1.00%	1.75%	1.50%	1.00%	1.00%	1.50%	2.50%	1.00%	1.00%	1.00%	1.00%
MIDDLESEX		1.00%	1.00%	1.75%	1.25%	1.00%	1.00%	1.50%	2.00%	1.00%	1.00%	1.00%	1.00%
MONMOUTH		1.50%	2.25%	1.00%	1.00%	1.00%	1.75%	1.00%	1.75%	1.25%	1.00%	2.50%	1.00%
MORRIS		1.25%	3.00%	1.00%	1.25%	2.50%	1.25%	1.50%	1.00%	1.00%	1.50%	1.00%	1.00%
OCEAN		1.00%	1.00%	1.00%	1.75%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.00%	1.50%
PASSAIC		N/A	N/A	N/A	N/A	N/A	N/A	1.00%	1.00%	1.00%	1.00%	2.00%	1.00%
SALEM		1.50%	1.00%	1.00%	1.00%	1.50%	3.00%	2.00%	1.50%	1.25%	1.00%	1.00%	2.00%
SOMERSET		2.00%	1.00%	1.75%	1.00%	1.50%	1.00%	1.75%	2.25%	1.25%	1.00%	1.75%	1.00%
SUSSEX		1.00%	1.00%	1.75%	1.50%	1.50%	1.25%	1.00%	1.00%	1.00%	1.50%	1.50%	1.75%
UNION		N/A	N/A	N/A	N/A	N/A	N/A	1.25%	1.50%	1.00%	1.00%	1.00%	1.00%
WARREN		1.00%	1.00%	1.00%	1.00%	1.00%	1.25%	2.25%	1.00%	1.00%	1.00%	1.00%	1.00%

NOTE: For use in short term (within 1-3 years) background growth ONLY.

Example: Assume existing condition is 1,500 peak hour trips and the applicable growth rate is 2%. The multiplication factor for 2% compounded for 3 years is 1.0612. The three-year peak hour forecast is 1,591.8, or 1,592 peak hour trips. $[1592 = 1500(1 + 0.02)^3 = 1500(1.0612)]$

Future Growth (compounded) = Present Growth * (1+Growth Rate)^{# of years}

Pass- By Rates Approved for Use in Traffic Analysis for Major Access Permits

July 1, 2018

*Trial Rates Approved by NJDOT for Access Permits

LUC	Type	AM%	PM%	SAT%
815	Freestanding Discount	NA	17	23
816	Hardware/Paint Store	NA	26	NA
820	Shopping Center	NA	34	26
843	Automobile Parts Sales	NA	43	NA
848	Tire Store	NA	28	NA
850	Supermarket	NA	36	NA
851	Convenience Market (Open 24 Hours)	NA	51	NA
853	Convenience Market w/Pumps	63	66	50*
854	Discount Supermarket	NA	21	NA
857	Discount Club	NA	37	30
862	Home Improvement Superstore	NA	42	NA
863	Electronic Superstore	NA	40	NA
880	Pharmacy without Drive-Thru	NA	53	NA
881	Pharmacy with Drive-Thru	NA	49	NA
890	Furniture Store	NA	53	NA
912	Drive-In Bank	29	35	38
931	Quality Restaurant	NA	44	NA
932	High Turnover Restaurant	NA	43	NA
934	Fast Food Restaurant W/Drive-Thru	49	50	NA
937	Coffee/Donut Shop W/Drive-Thru	63*	66*	50*
960	Super Convenience Market/Gas Station	76	76	50*

**LEVEL OF SERVICE CRITERIA
FOR
TWO-WAY STOP-CONTROLLED INTERSECTIONS¹**

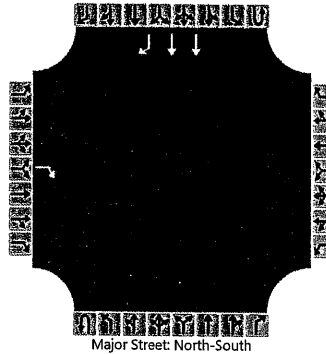
<u>Level of Service</u>	<u>Average Control Delay</u>
A	≤ 10.0 Seconds Per Vehicle
B	> 10.0 and ≤ 15.0 Seconds Per Vehicle
C	> 15.0 and ≤ 25.0 Seconds Per Vehicle
D	> 25.0 and ≤ 35.0 Seconds Per Vehicle
E	> 35.0 and ≤ 50.0 Seconds Per Vehicle
F	> 50.0 Seconds Per Vehicle

¹ Transportation Research Board, Highway Capacity Manual 2010, National Research Council, Washington, DC, 2010.

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	STK	Intersection	RT 31SB & NORTH ACCESS
Agency/Co	MRA	Jurisdiction	
Date Performed	3/3/2022	East/West Street	NORTH ACCESS
Analysis Year	2027	North/South Street	ROUTE 31
Time Analyzed	AM	Peak Hour Factor	0.95
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	17-182AFB-1 BUILD		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	1		0	0	0	0	0	0	0	0	0	2	1
Configuration				R											T	R
Volume (veh/h)				150											1740	200
Percent Heavy Vehicles (%)				3												
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized	No												No			
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)				6.9												
Critical Headway (sec)				6.96												
Base Follow-Up Headway (sec)				3.3												
Follow-Up Headway (sec)				3.33												

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)				158												
Capacity, c (veh/h)				273												
v/c Ratio				0.58												
95% Queue Length, Q ₉₅ (veh)				3.3												
Control Delay (s/veh)				34.8												
Level of Service (LOS)				D												
Approach Delay (s/veh)	34.8															
Approach LOS	D															

HCS7 Two-Way Stop-Control Report

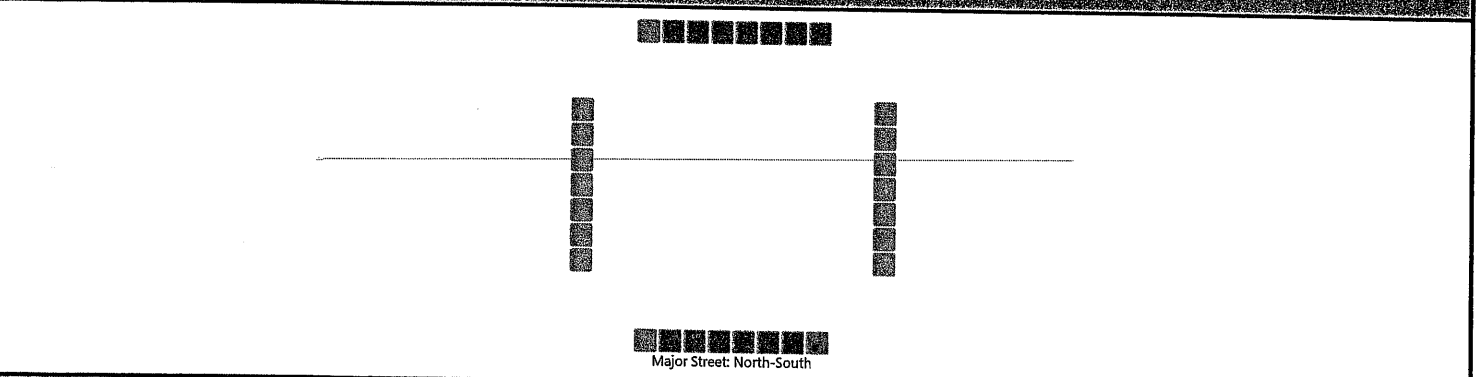
General Information

Analyst	STK
Agency/Co.	MRA
Date Performed	1/26/2023
Analysis Year	2027
Time Analyzed	PM
Intersection Orientation	North-South
Project Description	17-182PFB-1 BUILD

Site Information

Intersection	RT 31SB & NORTH ACCESS
Jurisdiction	
East/West Street	NORTH ACCESS
North/South Street	ROUTE 31
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	1		0	0	0	0	0	0	0	0	0	2	1
Configuration				R											T	R
Volume (veh/h)				191											977	200
Percent Heavy Vehicles (%)				3												
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized	No												No			
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)				6.9												
Critical Headway (sec)				6.96												
Base Follow-Up Headway (sec)				3.3												
Follow-Up Headway (sec)				3.33												

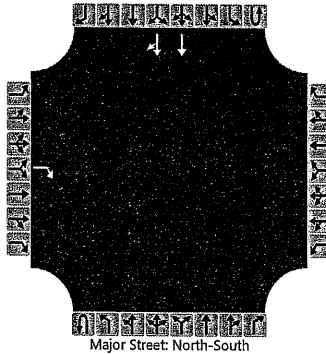
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)				201												
Capacity, c (veh/h)				503												
v/c Ratio				0.40												
95% Queue Length, Q ₉₅ (veh)				1.9												
Control Delay (s/veh)				16.9												
Level of Service (LOS)				C												
Approach Delay (s/veh)	16.9															
Approach LOS	C															

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	STK	Intersection	RT 31SB & SOUTH ACCESS
Agency/Co	MRA	Jurisdiction	
Date Performed	3/3/2022	East/West Street	SOUTH ACCESS
Analysis Year	2027	North/South Street	ROUTE 31
Time Analyzed	AM	Peak Hour Factor	0.95
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	17-182AFB-2 BUILD		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	1		0	0	0	0	0	0	0	0	0	2	0
Configuration				R											T	TR
Volume (veh/h)				105											1890	60
Percent Heavy Vehicles (%)				3												
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized	No															
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)				6.9												
Critical Headway (sec)				6.96												
Base Follow-Up Headway (sec)				3.3												
Follow-Up Headway (sec)				3.33												

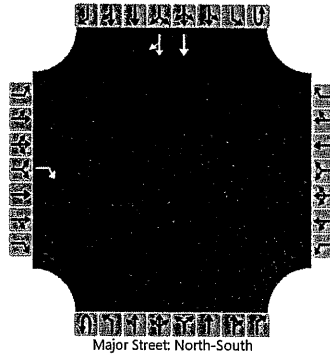
Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)				111												
Capacity, c (veh/h)				230												
v/c Ratio				0.48												
95% Queue Length, Q ₉₅ (veh)				2.4												
Control Delay (s/veh)				34.3												
Level of Service (LOS)				D												
Approach Delay (s/veh)	34.3															
Approach LOS	D															

HCS7 Two-Way Stop-Control Report

General Information		Site Information	
Analyst	STK	Intersection	RT 31SB & SOUTH ACCESS
Agency/Co.	MRA	Jurisdiction	
Date Performed	3/3/2022	East/West Street	SOUTH ACCESS
Analysis Year	2027	North/South Street	ROUTE 31
Time Analyzed	PM	Peak Hour Factor	0.95
Intersection Orientation	North-South	Analysis Time Period (hrs)	0.25
Project Description	17-182PFB-2 BUILD		

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	1		0	0	0	0	0	0	0	0	0	2	0
Configuration				R											T	TR
Volume (veh/h)				118											1150	117
Percent Heavy Vehicles (%)				3												
Proportion Time Blocked																
Percent Grade (%)	0															
Right Turn Channelized	No															
Median Type Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)				6.9												
Critical Headway (sec)				6.96												
Base Follow-Up Headway (sec)				3.3												
Follow-Up Headway (sec)				3.33												

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)				124												
Capacity, c (veh/h)				399												
v/c Ratio				0.31												
95% Queue Length, Q ₉₅ (veh)				1.3												
Control Delay (s/veh)				18.0												
Level of Service (LOS)				C												
Approach Delay (s/veh)	18.0															
Approach LOS	C															